UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

September 16, 1991

Mr. James Shafer (Code 1421)
Northern Division
Naval Facilities Engineering Command
U.S. Naval Base, Bldg. 77 Low
Philadelphia, PA 19112-5094

Dear Jim:

The purpose of this letter is to transmit comments regarding Appendix B of the Focused Feasibility Study for Sites 1 and 3. These comments were relayed verbally to the Navy by Mr. Wayne Lapham of the United States Geological Survey during our meeting on September 5, 1991. During this meeting the Navy agreed to modify the text accompanying the groundwater flow model (Appendix B) presented in the Focused Feasibility Study for Sites 1 and 3, and submit the revised text to EPA for review prior to finalization of the report.

The comments discussed are as follows.

1. Input data for the model should be clearly documented and assumptions regarding hydrogeologic data used in the model should be clearly discussed.

2. Page B-3: The reason for the assumption of a single-layer model should be discussed in detail. The decision to construct either a single- or multi-layer model should be based not only on the hydrogeologic system being modeled, but on the objectives of the modeling effort. For example, if one remedial alternative is installation of a slurry wall, a model should be designed that allows accurate simulation of a slurry wall. If actual construction of a fully penetrating slurry wall is not possible, then a multi-layer model (that would allow for simulation of a partially penetrating slurry wall) probably would be more appropriate than a single-layer model.

   In the report, the rationale for the decision to construct a single layer model is that the "groundwater flow system is conceptualized as a single layer system". It is assumed that the basis for the decision to construct a single-layer model goes beyond this general statement. The rationale should be discussed in detail to convince the reader that a single-layer model is appropriate.

3. Page B-3: "Groundwater flowing beneath Sites 1 and 3 is interpreted to discharge to Mere Brook". What data are available to support this interpretation? Have discharge measurements been made on Mere Brook? What were the results? What is the rate of ground-water discharge to the brook? If this information was submitted in another report, it should be summarized here and other references provided.

4. Figure B-1 and B-4: Data points used for construction/ interpretation of all hydrogeologic maps should be included on the maps. For example, all field-measured heads used to draw the head map should be included on the map, and data used to construct the elevation of the top of the Presumpscot clay and/or thickness of the aquifer above the clay should be shown on those maps.

5. Page B-4: The assumption that the Presumpscot clay is a lower no-flow hydraulic boundary needs additional discussion. For example, is there any vertical head or water-quality data to support this ascertain? This should be discussed in the text.

6. Page B-5: Mere Brook is simulated as a river with a constant stage. This assumption should be discussed in relation to how actual conditions differ from those simulated with the model. For example, if Mere Brook is a small brook, could pumping for remediation significantly lower the stage of the brook or dry the brook up entirely? Discuss whether either of these might occur and how this might affect actual conditions at the site in comparison of those simulated in the model.

   Discussion of the selection of an initially assumed vertical hydraulic conductivity of 0.11 ft/day for the streambed on Mere Brook is needed. What is the basis for selection of this value?

7. Page B-7: There should be comparison and discussion of measured heads to model-calibrated heads, and measured fluxes to model-calibrated fluxes. How well does the model simulate the flow system? The report should present a convincing argument to the reader that the model well simulates the groundwater flow system. For example, isn't there a groundwater mound beneath the landfill? If so, why doesn't the model simulate this mound?

8. Page B-8: Simulating a slurry wall in a one-layer model assumes the slurry wall is fully penetrating. Is it realistic to assume a slurry wall can be constructed down to the Presumpscot clay? This assumption should be discussed. A discussion of possible leakage vertically through the clay underlying the site also would be appropriate.

9. Page B-8: The report states that a clay cap was simulated. A more accurate statement is that reduced recharge was simulated in the model. This reduced recharge indirectly simulates the presence of a clay cap. This should be clarified in the text.

10. Page B-9: Clarify if the simulation shown in Figure B-6 includes reduced recharge as well as simulation of a slurry wall.

11. Page B-12: In the Summary, it is stated that "The groundwater gradients, flow directions, hydraulic conductivity, and mass balances simulated in the model all reasonably match with field data and observed hydraulic conditions." Because hydraulic conductivity is directly input into the model on the basis of the field data it is not surprising that modeled conductivities agree with field-determined conductivities. No data were provided regarding groundwater fluxes, so it is not evident that modeled and field measured mass balances agree.

    In the separate listing of input data for the groundwater flow model, the hydraulic conductivity for the general-head boundary condition on the northern boundary increases by one order of magnitude for row 1, columns 8-23 from that for columns 1-7 and 24-29. Explain this increase.

12. An important element of a modeling study is an appraisal of the flow model. This appraisal should clearly discuss the limitations and deficiencies of the model and provide direction for model improvement. An appraisal of the model, including a discussion of its limitations, must be included in the text.

Should you have any questions regarding any of these comments please contact me at (617)573-5785.

Sincerely,

Meghan F. Cassidy

Meghan F. Cassidy
Remedial Project Manager

cc: Ted Wolfe/ME DEP
Mel Dickenson/EC Jordan
Wayne Lapham/USGS
Dick Willey/EPA